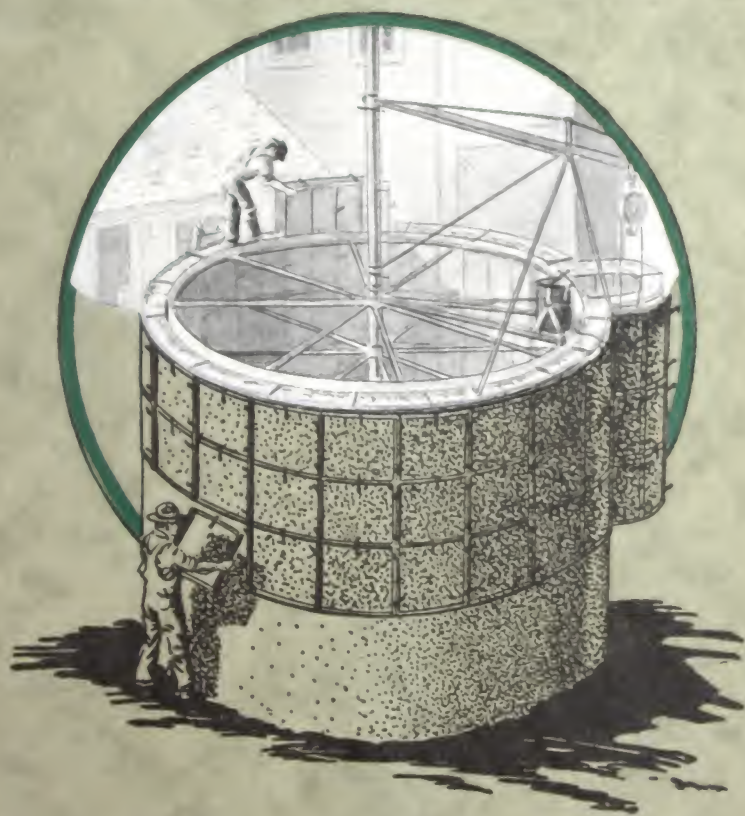


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# Metaform

Interlocking Steel Forms  
*for* Circular  
Concrete Work



**Metal Forms Corporation**  
Milwaukee, Wisconsin, U.S.A.





# Metaform



**Metal Forms Corporation**  
Milwaukee, Wisconsin, U.S.A.



Whether a single silo or a structure of many units, Metaforms  
are equally adaptable. always profitable.



# Metaform Outfits

## *for* Cutting Costs on Circular Concrete Work



**T**HE contractor who depends on old-time wood forms for concrete structures is at a serious disadvantage.

With wood, he must combat almost prohibitive costs of material and labor, excessive wastage and delayed pouring while the wood forms are being erected.

These difficulties, bad enough with straight work, become practically insurmountable on circular walls of silos, elevators, tanks and the like.

On these, continuous built-up forms are wholly impractical, while the common substitutes—clumsy slip-forms—are too slow, unwieldy and inflexible to meet the present-day necessity for speed and economy.

Metaforms take the place of wood forms. Each Metaform unit is a small, easily handled steel plate strongly reinforced and provided with simple, sturdy clamping devices. These standard plates and their accompanying fittings are assembled in an amazingly short time into concentric two-foot bands or courses which are all ready to receive concrete. The units are so adaptable that within a few hours a form of almost any size, shape or thickness may be set up ready for pouring.



## Metaform

The economies made possible by using Metaforms instead of wood forms are most substantial. To the man who uses them for the first time, the savings are unbelievable. Metaforms are handled by a few unskilled laborers—and several high-priced carpenters are eliminated from the payrolls. They are durable, they last indefinitely and are regarded as permanent equipment. They do away with the use and heavy wastage of form-lumber. They are ready to receive concrete in a few hours instead of the days that it takes to erect wood forms.

Three courses of Metaforms are all that are necessary. As fast as the work progresses, a lower course is placed on the upper course. The mixer is never held back. The work is absolutely true, uniform and smooth. Any contractor who has ever used Metaforms would as soon discard his mixer in favor of hand labor as to go back to wooden forms.

Metaform equipment for straight construction is described in detail in another book. The Metaform outfits for general circular construction are described and illustrated on the pages following. The small extra equipment needed for the construction of silos is also taken up in this book, as well as the subject of Metaforms adapted to circular jobs of special design.



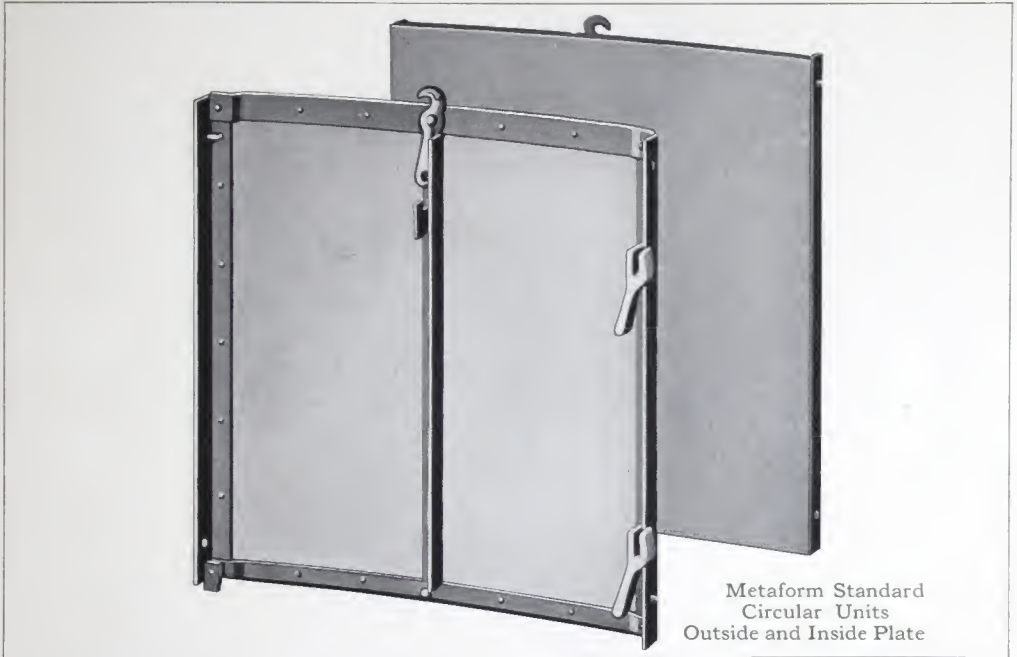
Round-tapered Metaform Structure

### Metaforms for Circular Construction

There is nothing new about the use of Metaforms for chimneys, towers, grain-elevators, silos, water tanks, reservoirs and settling tanks. For many years wide-awake contractors have cleared maximum profits on round construction by using their versatile Metaform outfits on every job. Metaform methods have solved every problem of circular concrete construction. An observer need only see a Metaform circular outfit on a single piece of work to appreciate how amazingly it reduces costs and speeds up construction.

Metaform outfits for round construction are built on the same principle as Metaforms for straight work—the standard interchangeable unit idea. From the first, Metaforms have been developed





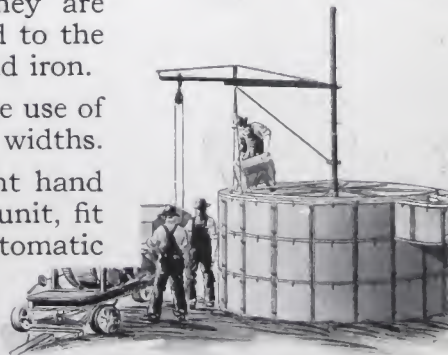
with standardization always in mind. A new standard Metaform unit will lock as snugly and fit as perfectly among the Metaforms built ten years ago as it will among the units of today. As the contractor's needs expand—and they invariably do expand when he sees what Metaforms are doing for the profit side of his ledger—he can add to his original outfit in the knowledge that new units will fit in as an integral part with his first equipment.

### The Standard Unit

The standard unit of the Metaform circular outfit is a curved plate of 16 gauge sheet steel. Two sets of these plates, one concave and one convex, compose the inner and outer shells of the form. They are stiffened vertically by 1"x1" angle iron riveted to the edges and strengthened horizontally by 1" band iron.

Different circumferences are obtained by the use of fractional plates of same height but of various widths.

Steel Dowel Pins riveted in the upper right hand corner and the lower left hand corner of each unit, fit into holes in adjacent units and insure an automatic



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## Metaform

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alignment of plate to plate. There is no chance for even the most inexperienced labor to make a mistake.

Simple Clamps of malleable iron lock the plates together securely. Two of these clamps are riveted stoutly to the right-hand side of each standard and fractional unit. A hook-clamp centered at the top of each unit, catches a raised rivet on the bottom edge of the plate above, making a smooth, tight joint. There are no loose parts to be misplaced or lost. Each unit is self-contained.

When the unit is set in place, a single upward push on each of the two clamps locks it firmly to its neighbor. A reverse movement unlocks it. Neither for tightening nor holding are there used any loose wedges or pins, nor any other separate or loseable tools or parts. No special tools of any kind are ever needed. A tap or two with a hammer is all that is ever necessary.

The cheapest labor cannot go wrong on a set-up of such sheer simplicity. The original set-up requires only ordinary care; after the first course is set, the upward progression of the shell-units is almost automatic. When the work has advanced so far that the plates cannot be reached from the ground, they are handled from the top by means of a long hook, which is furnished with the outfit. The clamps are loosened





with the handle end of this hook, the eye of the hook clamp caught, and the plate drawn upward and placed on the top course. The plates of the shells are so tight and perfectly fitted that nothing but a uniform, absolutely smooth surface can result.

### Center Mast

The entire structure is erected around a center mast and kept in perfect alignment by the accompanying fittings. This mast consists of lengths of  $2\frac{1}{2}$ " extra heavy pipe resting on a cast flange at the bottom. A series of holes is drilled through this pipe at intervals of 24", through which cold rolled iron bars are inserted. These rods not only support the center collars, but form a ladder for use while construction is proceeding. The center mast also forms a support for the derrick attachment, which is placed as soon as construction gets well under way.

### Adjustable Scaffold Arms

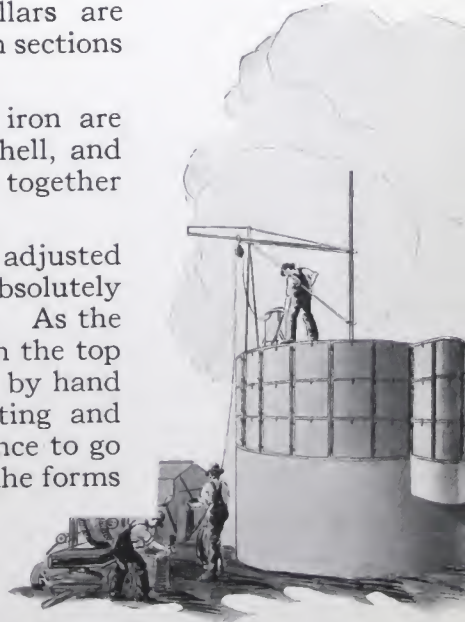
Two sets of scaffold arms, radiating from the mast to the inner shell, hold the structure true. The upper set of arms forms a base on which scaffold planks are placed. The scaffold arms are composed of angle irons adjustable to different diameters.

Rings built of angle iron support the outer ends of the scaffold arms. These rings are in sections locked together by means of clamps, and are supported by clips or ring-rests riveted to each inside plate.

Center Collars bolted to the center mast lock the inner ends of the scaffold arms. These collars are slotted to receive the arms, and are cast in twin sections to bolt around the mast.

Stay Rods—short lengths of slotted T iron are slipped over the top of the inner and outer shell, and effectually hold the two shells concentrically together at the proper distance.

This Compact Assembly of portable, easily adjusted and erected parts compose a form that is absolutely stable and accurate to the fraction of an inch. As the bottom course of plates is taken off and set on the top course, the scaffold arm units are easily raised by hand to a corresponding position. After the footing and first course are set, there is absolutely no chance to go wrong. The structure goes up just as fast as the forms can be erected and the concrete poured.



### Hoisting Attachment and Distributor

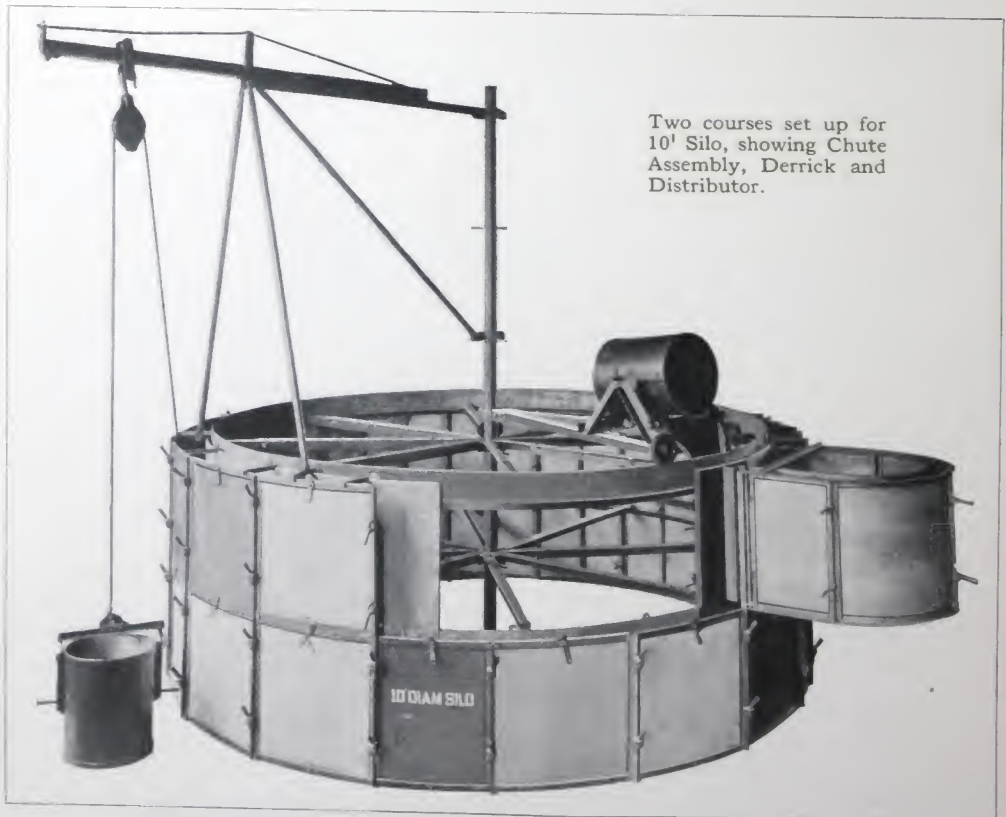
The hoisting attachment is a light steel derrick, strongly braced and supported by center mast and outer legs. Its use enables the concrete to be raised and transferred to the distributor quickly and efficiently.

The carrier or distributor enables the contractor to distribute and pour the concrete with a minimum of effort and time. This outfit, like the derrick, is easily raised as each successive course is placed on the shell.

The Track on which the carriage runs is built of wide band iron in adjustable sections. It is placed on the top ring of the outfit.

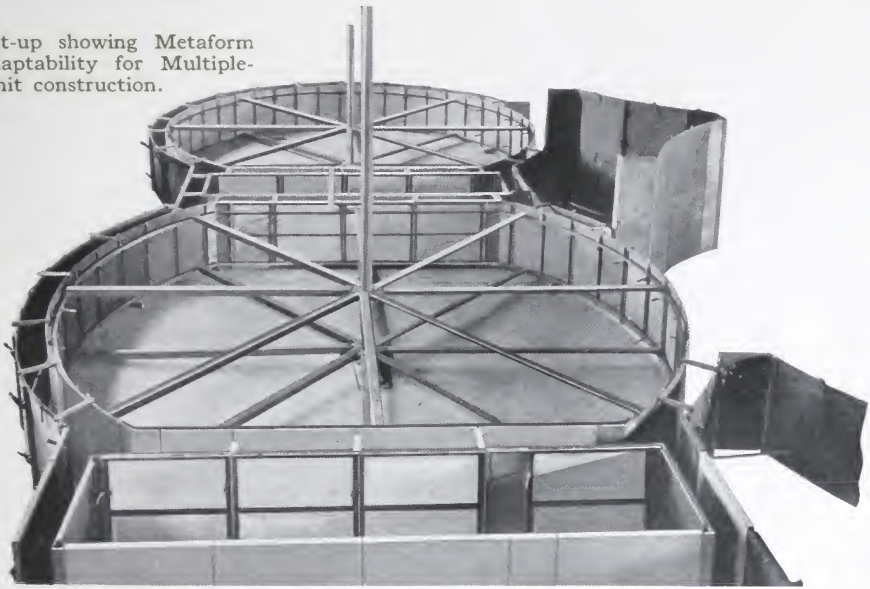
The Carriage Frame is of adjustable length to fit the different diameters. It is pivoted to the center mast by means of a split collar. Two flanged wheels support the outer end on the track.

Two Tip-Buckets of large size are furnished. The loaded bucket replaces the empty one in the carriage and is run to the proper place for





Set-up showing Metaform adaptability for Multiple-Unit construction.



discharge. This arrangement insures discharge squarely in the middle of the form, an apron on the carriage preventing any slopping.

Ingeniously designed, easy-running and trouble-proof, this outfit is a substantial member of the Metaform family of profit builders.

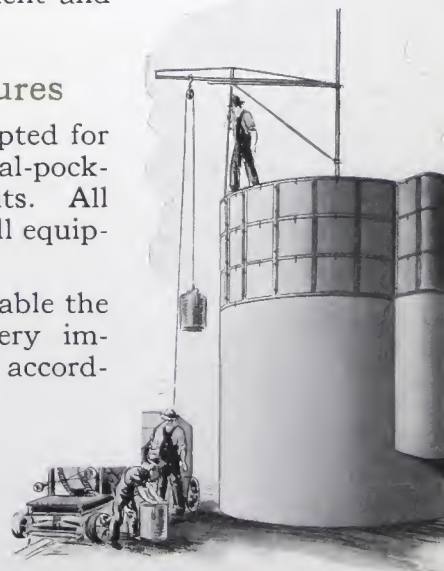
### Roof Forms

These are furnished in either of two types. They are described in the pages devoted to silo equipment and illustrated on pages thirteen and fourteen.

### Metaforms for Multiple-Unit Structures

Metaform circular outfits are specially adapted for the monolithic construction of storage bins, coal-pockets and grain elevators composed of several units. All that is required in addition to the standard shell equipment are inexpensive connecting forms.

Metaform methods on this class of work enable the contractor to perform something that is very important—to place his reinforcements strictly according to specifications.

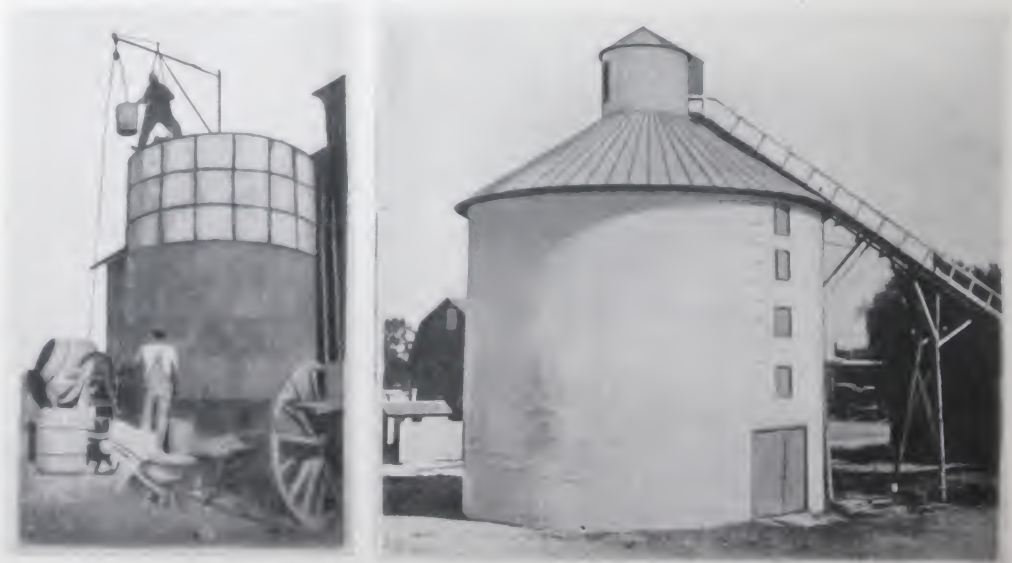


### Metaforms for Silo Construction

**C**ONCRETE has demonstrated so thoroughly its superiority for use in silo construction that there is little need for added testimony here. The farmer needs little education in this line. He realizes the fire risk attached to wooden silos, to say nothing of the Summer shrinkage and resultant danger of a wooden silo being blown over by the first severe wind storm because of its own unsupported weight. He knows the higher cost of stone construction. The farmer of today is a strong believer in concrete construction.

Nor is there an argument as to the best type of concrete construction. Show a farmer a solid Metaform-built silo as compared to one built of concrete slabs or blocks—the smooth, handsome, substantial appearance of a Metaform job is alone sufficient argument in favor of the monolithic construction. It is a better job through and through; stronger, smoother, simpler.

It remains for wideawake contractors to prove that they are wide awake—and make extra profits the Metaform way. A farmer will not stand for delays—he must have his silo by the time his silage is ready. The contractor must make the most of his season; he wants to put up just as many jobs as he can. And there is no denying that he can do each job faster the Metaform way. His labor cost will be smaller, his profits



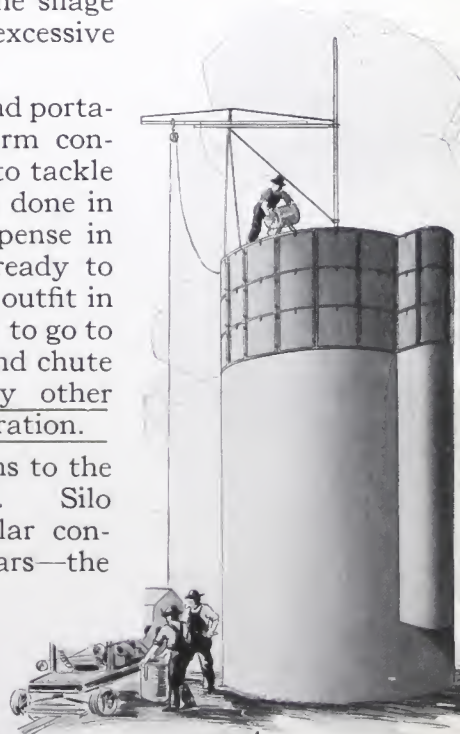




larger, his work better. The farmer is better satisfied with a Metaform job; he likes those smooth surfaces. And a smooth inner surface is essential, for the silage must settle uniformly or there is going to be excessive spoilage.

Take particular notice of the adaptability and portability of Metaform equipment. The Metaform contractor is not tied to one diameter; he's ready to tackle anything within reason. And when his job is done in one place he's put to a very minimum of expense in moving to the next job. His equipment is ready to move on instant notice; he can pack the whole outfit in a single load, he unloads it and it is all ready to go to work again—erecting at least six feet of wall and chute every working day. These facts put every other method in the background and out of consideration.

Silo construction calls for very few additions to the Metaform circular outfit already described. Silo construction differs from any standard circular construction job in only two important particulars—the chute and the continuous door.



### Chute Forms

Metaforms provide for a round chute. The units of the Metaform chute outfit are similar to the standard Metaform unit plates. A single course of the eight plates used in the construction of a round chute are shown in the illustration below. The fittings are the same as those used on the standard plates; the courses are as easily set up and taken down.

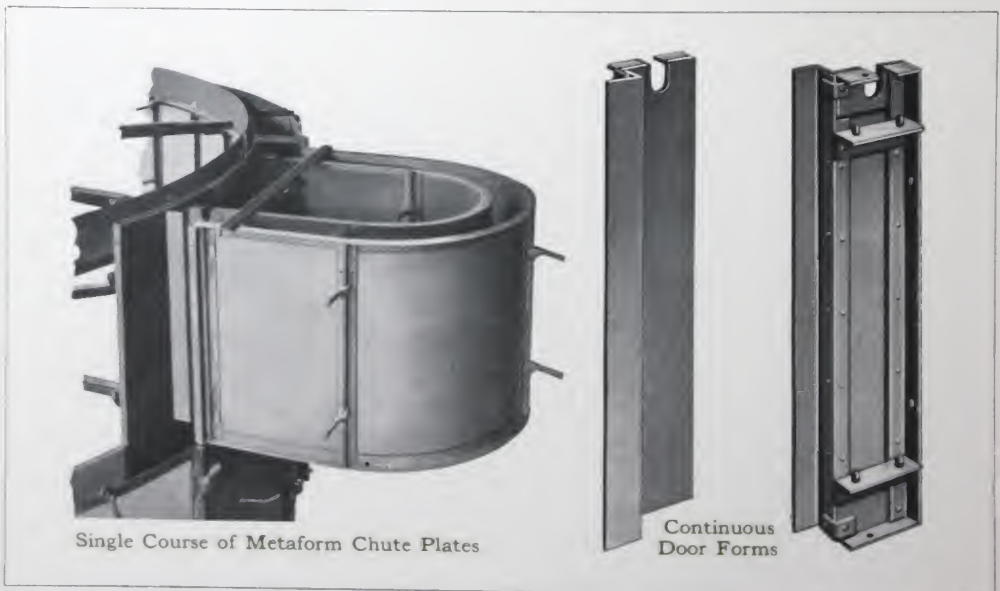
### Continuous Door Forms

These consist of two specially designed units which fit into the shells at the intersection of the chute forms. Their construction provides for the slot which holds the planks forming the continuous door.

### Roof Forms

A Metaform contractor is never puzzled about the roof problem. He has his choice of two adjustable Metaform roof molds, each as simple and efficient as he has learned all Metaform equipment to be.

The Adjustable Metaform Dome Roof Mold makes the handsomest roof ever placed on a silo. When this form is not in use, it is as compact and portable as any Metaform equipment. It consists of curved segments which rest on the silo wall proper and are bolted to a ring at the top. The angles of the separate section fit into bolts in the ring, thus locking the





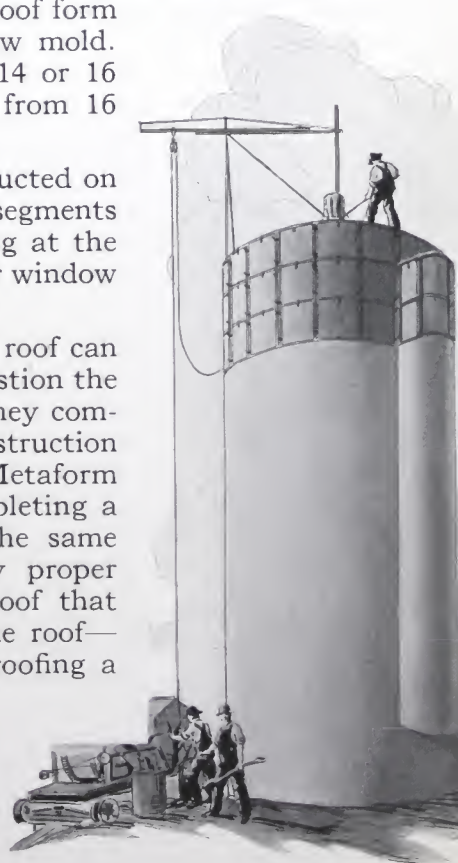
Metaform Adjustable Dome  
Roof Mold, showing Cornice  
and Dormer Window Mold



entire equipment, or enabling the contractor to stow it in small space when moving from one job to another. The roof form includes complete cornice and dormer window mold. The standard size is adjustable to a 10, 12, 14 or 16 foot diameter. The large size is adjustable from 16 feet to 20 feet.

The Metaform Cone Roof Mold is constructed on the same principle. It consists of straight segments resting on the side walls, and bolted to a ring at the top. It includes a complete cornice and dormer window mold and is self-supporting.

With either of these Metaform outfits the roof can be cast in a single day. They are beyond question the only successful roof forms on the market. They completely solve the once-troublesome round construction roof problem. Since the development of the Metaform roof molds, no contractor is justified in completing a silo with anything but a concrete roof. The same reasons that point to concrete as the only proper material for silo construction, are logical proof that there should be only one material used in the roof—and that is concrete. No other method of roofing a Metaform-made silo should be considered.





Metaform Adjustable Cone Roof Mold in Use

### Additional Metaform Equipment for special Circular Construction

There are many jobs of special form which may be executed at great reduction in cost by the use of standard Metaform equipment in connection with Metaform equipment specially designed and adapted to the work. The construction of sewer manholes (as shown in the photographs on page 16) has been greatly simplified and costs cut by the use of standard and special Metaform equipment.

Metaform outfits are the only satisfactory solution of the problems that arise on jobs of this nature. Special forms are essential, and the simple, easy-to-handle, Metaform units offer the only practical method of form-making where space is so limited. The greater speed made possible by using a Metaform outfit increases profits substantially.

Any contractor doing this class of work will do well to send an outline of his problem to the Engineering Department of the Metal Forms Corporation. Suggestions and plans will be furnished and prices submitted without obligation.



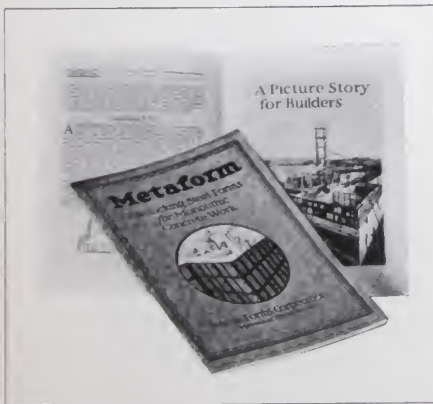
## The Opportunity for the Metaform Equipped Contractor

**T**HE Metaform contractor should not be content with silo construction; he is equipped to strike strongly for many types of work. Of course silo construction in itself offers an unlimited field. Many contractors, for instance, average twenty-five silos a season with a single Metaform outfit, while many keep two or more outfits at work, each one putting up between twenty and thirty silos during the working season.

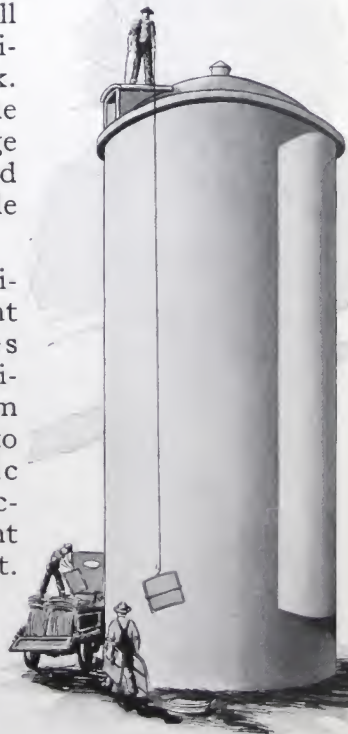
But there are many opportunities. The contractor can use his Metaform equipment on reservoirs, milk houses, water tanks, railway tanks, grain elevators, coal-pockets, chimneys, cisterns, and bins. Once started, he should not confine himself to circular construction. Every community offers countless opportunities for securing straight construction jobs. Metaform standardized equipment for straight monolithic construction will save him labor, time and money, and enable him to turn out better work, just as Metaform circular equipment has done. And he can outbid and out-profit any contractor who is not Metaform-equipped.

### Metaform Outfits for Straight Construction

After reading this book, contractors who have experienced the problems of wood forms on straight-wall concrete construction will have some idea of the possibilities of Metaform methods on that class of work. They will readily understand the simplicity of the straight-construction Metaform units and the large savings over wood forms made possible by their use.



A companion edition to the present book illustrates clearly and graphically the Metaform idea as applied to straight monolithic concrete construction. It will be sent free upon request.



## Metaform



Special Metaform Man-hole Outfit in Use

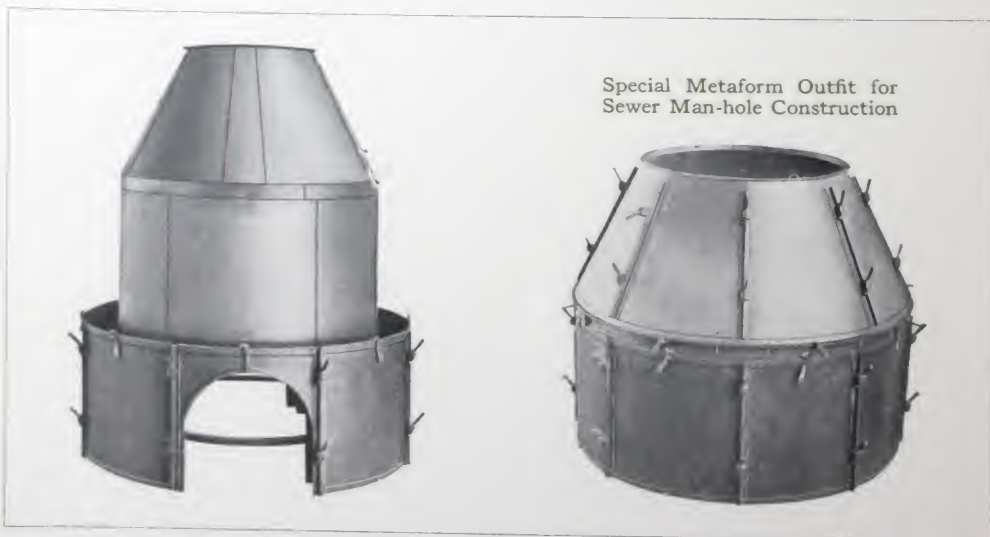




Table of Plates  
Required for Various Sizes of Circular Structures

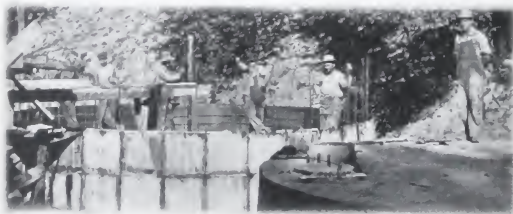
It requires the addition of only a few parts to adapt an outfit for use on larger diameter structures. The Metaform plates are standard units, and a few more of these, together with the required fractional plates, will increase the circumferences of the courses to the desired size. All other parts, with the exception of rings which support the scaffold arms, are adjustable to several different dimensions.

Inside Diameter	Wall	Inside Plates		Outside Plates With Chute	
		Standards 24"x24"	Adjustable Fractionals	Standards 24"x24"	Fractionals
10'	7"	15	1 15 1/2"x24"	16	None
	6"	15	1 15 1/4"x24"	15	1 18 1/4"x24"
12'	7"	18	1 20"x24"	19	1 5 1/8"x24"
	6"	18	1 20"x24"	18	1 23"x24"
14'	7"	21	1 23 1/2"x24"	22	1 8 1/8"x24"
	6"	21	1 23 1/2"x24"	22	1 2 1/8"x24"
16'	7"	25	1 2 3/4"x24"	25	1 11 1/2"x24"
	6"	25	1 2 3/8"x24"	25	1 5 3/8"x24"
18'	7"	28	1 5 1/4"x24"	28	1 14 1/4"x24"
	6"	28	1 5 1/4"x24"	28	1 7 7/8"x24"
20'	7"	31	1 8 7/8"x24"	31	1 18 1/4"x24"
	6"	31	1 8 7/8"x24"	31	1 11 7/8"x24"

NOTE: Where Chute is not to be built, the addition of 1—12"x24" and 1—24"x24" Filler Plate is necessary in place of the Chute Molds.

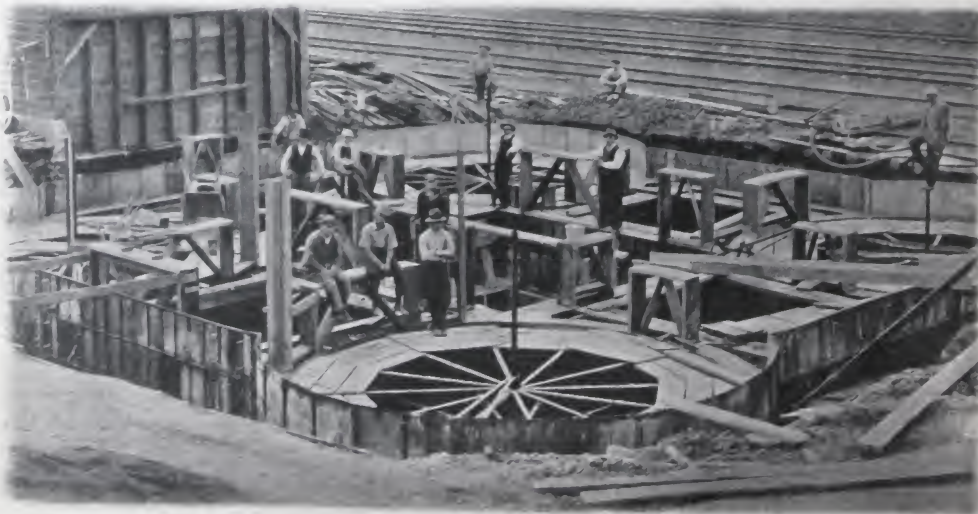
Get the outfit that seems best fitted for your needs. You are certain that as your needs expand you can add a few parts to your original outfit and bring it up to the new requirements.

## Metaform



Metaform outfits recognized no limitation of size or peculiar shape.

The lower photograph shows how readily Metaform straight-construction units may be combined with Metaform circular equipment.

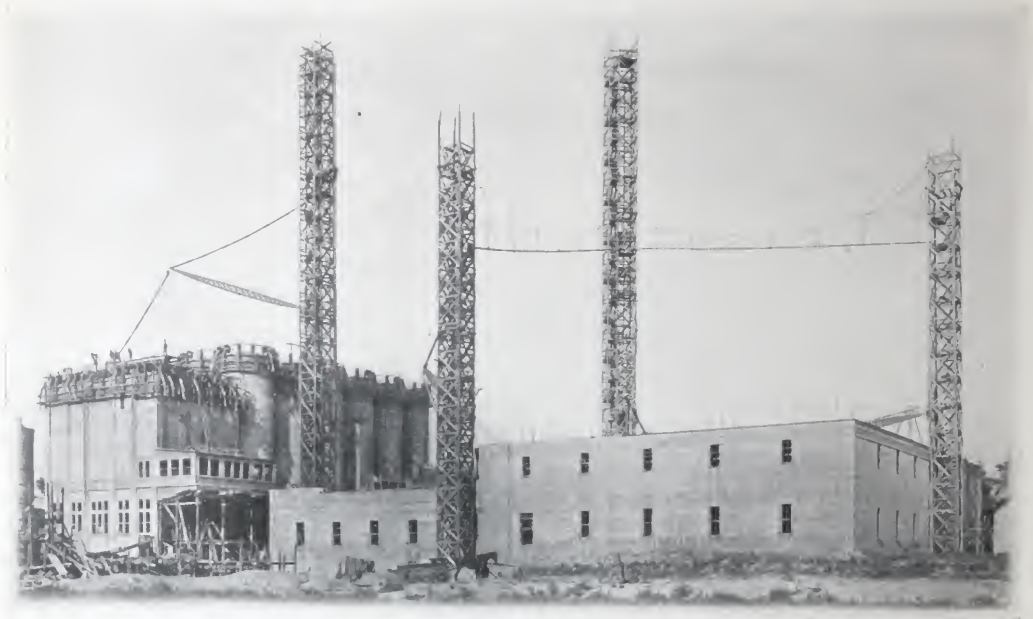




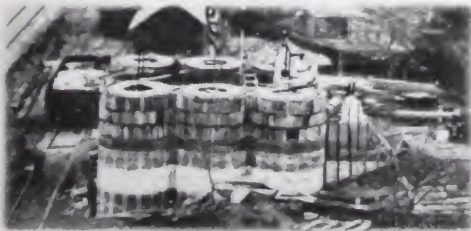
# Convincing Proof *in* Picture Form



Many photographs from many states,  
showing Metaforms "in action"  
and jobs that they have completed







More photographic proof of Metaform adaptability and versatility. A particularly difficult job is a particularly good place to cut costs and speed construction the Metaform way.



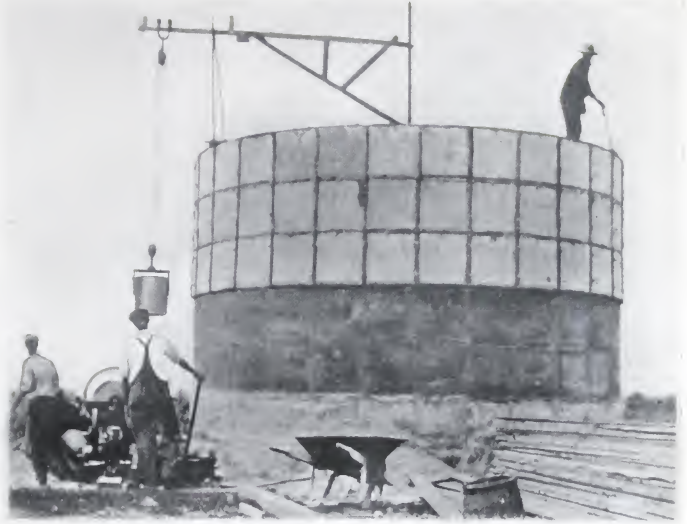
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## Metaform

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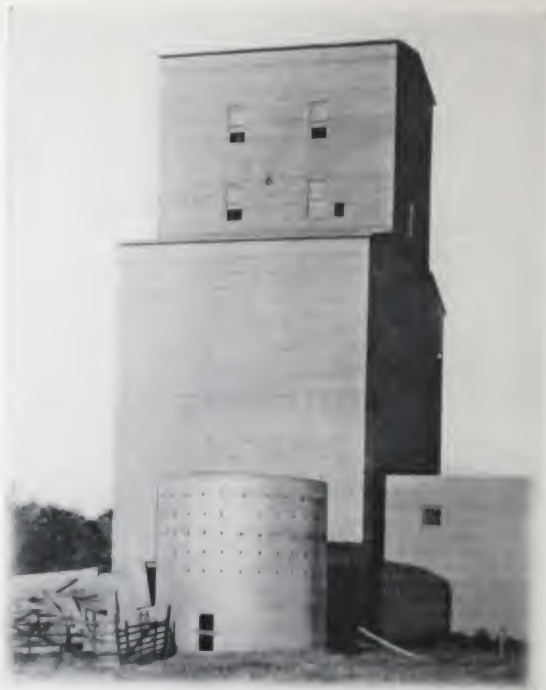
A Metaform outfit is an active advertisement of a contractor's progressiveness.  
A finished Metaform job is a standing advertisement of the high quality of his work.



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## Metaform

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A multiple-unit Metaform outfit can be used in the construction of an elevator or coal pocket—and then split into several separate busy silo outfits. Metaform dependable adaptability means bigger profits



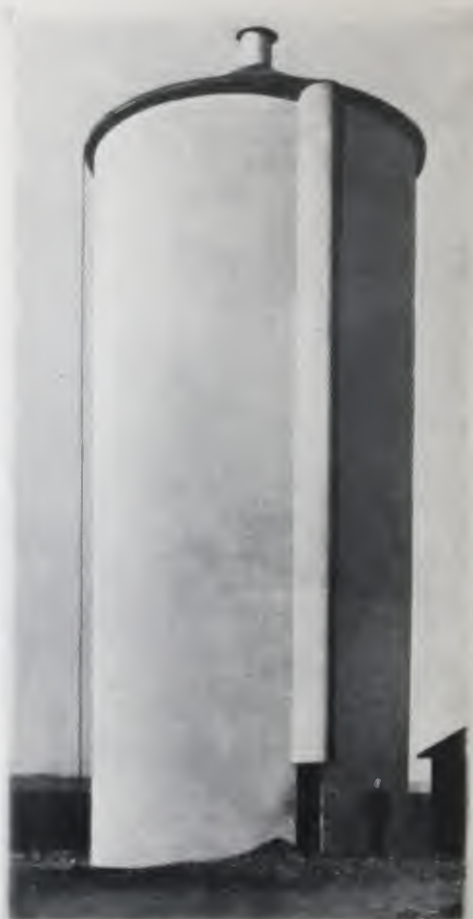
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## Metaform

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Every job done without the aid of a Metaform outfit means many cost-dollars that should have been profit-dollars.







Each season that comes and finds us Metaform makes added to your equipment, specially by and having some of the extra profits that should be yours.





Metal Forms Corporation  
Milwaukee, Wisconsin, U.S.A.





